

WHAT IS CLAIMED IS:

1. A fastening system for anchoring wood floors to a base, the system comprising:

a fastener having a shank, a pointed distal end, and a proximal head end having an enlarged diameter head with a proximal surface;

a sleeve for retaining structural members of the floor, said sleeve having a central bore therethrough, a countersink extending distally from a proximal end of said sleeve and coaxially with the bore, and an annular flange extending outwardly from the sleeve proximal end; and

a driver for driving said fastener through the sleeve countersink and the sleeve bore and into the base, said driver comprising a nozzle having a bore for receiving said fastener, the nozzle being adapted to enter the sleeve countersink, said driver further comprising a hammer disposed in the nozzle and movable to engage the proximal surface of the head of said fastener and to drive said fastener into locking engagement with the base, to fix said sleeve to the base, and thereby fix the structural members to the base.

2. The fastening system in accordance with claim 1 wherein the fastener shank is provided with a distal portion having a diameter about equal to a diameter of the sleeve central bore, a proximal portion having a diameter larger than the diameter of the shank distal portion and the diameter of the sleeve central bore.

3. The fastening system in accordance with claim 1 wherein said driver further comprises a spring-biased safety rod having a distal end engageable with the sleeve annular flange and movable thereby against the spring-bias to place said driver in firing condition.

4. The fastening system in accordance with claim 1 wherein said driver further comprises a magazine for retaining a plurality of fasteners therein and for serially feeding the fasteners to said nozzle for the engagement with said hammer.

5. The fastening system in accordance with claim 1 wherein the structural members comprise at least one elongated board having therein a plurality of holes, each hole having a counterbore defining an annular surface in the hole, the boards each being supported by resilient pads mounted on the base, the sleeve flange being configured such that the annular surface in the board hole is engaged by the sleeve annular flange at about the same time as the base is engaged by a bottom end surface of the sleeve upon insertion of the sleeve into the board hole.

6. The fastening system in accordance with claim 5 wherein upon driving of said fastener by said hammer, the head of said fastener engages with a bottom end wall of the sleeve countersink and proceeds no further, whereby to connect the sleeve and board to the base without compressing the pads.

7. The fastening system in accordance with claim 1 wherein the sleeve central bore is sized to accommodate the fastener shank and the sleeve countersink is sized to receive the nozzle of said driver.

8. The fastening system in accordance with claim 5 wherein an axial extent of the sleeve annular flange is less than the axial extent of the board hole counterbores.

9. The fastening system in accordance with claim 8 wherein said at least one board has an upper surface and a lower surface, and the overall length of said sleeve is less than a distance between said upper and lower surface.

10. The fastening system in accordance with claim 9 wherein an axial length of said sleeve, less the axial length of the sleeve flange, is equal to a distance between the counterbore annular surface of said at least one board and the lower surface of said at least one board.

11. The fastening system in accordance with claim 7 wherein the holes in the board are about 0.040 inch to about 0.060 inch larger than an outside diameter of the sleeve.

12. The fastening system in accordance with claim 1 and further comprising a washer disposed inside the sleeve countersink in engagement with a countersink bottom end wall, the washer being engageable by the fastener head when the fastener is driven into the base.

13. A fastening system for anchoring wood floors to a base, the system comprising:

- a fastener having a shank, a pointed distal end, and a proximal head end having an enlarged diameter head with a proximal surface;

- a sleeve for retaining structural members of the floor, said sleeve having a central bore therethrough, a countersink extending distally from a proximal end of said sleeve and coaxially with the bore, and an annular flange extending outwardly from the sleeve proximal end, said countersink having a depth greater than the thickness of said head measured lengthwise of said fastener.

14. A fastening system in accordance with claim 13 further including an elongate attachment member having upper and lower sides characterized by upper and lower surfaces respectively, and compressible pad means attached to the lower surface of said attachment member, at least one hole extending through

said attachment member from said upper surface to said lower surface, said hole being sized to accommodate said sleeve shank of said fastener.

15. A fastening system in accordance with claim 14 wherein said attachment member has a countersink for said hole on it said upper side, said countersink being sized to accommodate said annular flange so that annular flange resides wholly between said upper and lower surfaces.

16. Method for anchoring to a concrete base a floor attachment assembly that comprises a floor attachment member having top and bottom sides, at least two compressible pads attached to the bottom side of said floor attachment member, and two holes extending through said attachment member, said method comprising the following steps:

(1) providing a fastener and sleeve assembly that includes a fastener having a shank with a leading end and a trailing end and a radially-projecting head at said trailing end, and a sleeve having a bottom end and a top end, a radially projecting flange at said top end, an axial bore, and a countersink for said axial bore at said top end, with said leading end of said shank intruding into said axial bore via said countersink;

(2) inserting said fastener and sleeve assembly into one of said holes with said bottom end of said sleeve projecting below the bottom side of said attachment member and with the head of said fastener disposed above and spaced from the top side of said attachment member;

(3) providing a pneumatically powered tool having a nozzle, a hammer bore in said nozzle, and a hammer mounted for reciprocal movement in said hammer bore;

(4) inserting said nozzle in said countersink so that the head of said fastener intrudes into said hammer bore; and

(5) operating said tool so that said hammer impacts said fastener head with sufficient force to drive said fastener into said concrete base far enough to cause the head of said fastener to (a) force said flange into tight engagement with said attachment member and (b) anchor said attachment member to said base without compressing said pads.

17. Method according to claim 16 wherein in step (1) the head of said fastener extends above said attachment member.

18. Method according to claim 16 wherein in step (5) the depth of penetration of said fastener into said base is limited by said sleeve.

19. Method for anchoring to a concrete base a floor attachment assembly that comprises a floor attachment member having top and bottom sides, at least two compressible pads attached to the bottom side of said floor attachment member, and two holes extending through said attachment member, said method comprising the following steps:

(1) providing a sleeve having a bottom end and a top end, a radially projecting flange at said top end, an axial bore, and a countersink for said axial bore at said top end,

(2) providing a manually operable pneumatic driver having a nozzle member comprising an elongate nozzle having an end section with an end surface that is sized to fit in said countersink, a striker bore in said nozzle extending for the length of said nozzle, a side opening in said nozzle leading to said striker bore, a striker mounted for axial movement in said striker bore, means for reciprocally driving said striker through (a) a rapid drive stroke whereby said striker is moved from an at-rest position in which the striker is withdrawn into said bore to an extended fastener-driving position in which said striker projects beyond said end surface and (b) a rapid return stroke whereby the striker is withdrawn from said

fastener-driving position back to said at-rest position; a magazine for holding a plurality of fasteners each characterized by a shank and a flanged head, and means for feeding fasteners into said striker bore via said side opening when said nozzle is in said at-rest position,

(3) inserting said sleeve into one of said holes with its said flange overlying the top side of said attachment member;

(4) inserting said nozzle in said countersink so that said striker bore is coaxial with said axial bore;

(5) operating said tool so that said striker impacts the head of a fastener positioned in said striker bore with sufficient force to drive said fastener so that its shank passes through said axial bore and penetrates said concrete base far enough to cause the head of said fastener to (a) force said flange into tight engagement with said attachment member and (b) anchor said attachment member to said base without compressing said pads.

20. Method according to claim 19 wherein said end section of said nozzle has a cylindrical outer surface.

21. Method according to claim 19 wherein said end section of said nozzle is sized to make a close fit with said countersink.

22. Method according to claim 19 wherein in step (5) the depth of penetration of said fastener into said base is limited by said sleeve.

23. Method according to claim 19 wherein when said sleeve is inserted into said hole, the bottom end of said sleeve projects below said attachment member by a predetermined amount so that it is substantially flush with the bottom side of said each compressible pad.

24. Method according to claim 19 wherein in step (5) the depth of penetration of said fastener into said base is limited by said sleeve.

25. Method according to claim 19 wherein said the heads of said fasteners are sized to make a close sliding fit in said striker bore.